TECHNICAL REVIEW DOCUMENT For OPERATING PERMIT 080PWE311

Spindle Hill Energy, LLC Weld County Source ID 1235468

March 2012 – August 2013

Operating Permit Engineer:

Operating Permit Supervisor review:

Field Services Unit review:

Joshua Jones

Mathew Burgett

Jeremy Neustifter

I. Purpose

This document establishes the basis for decisions made regarding the Applicable Requirements, Emission Factors, Monitoring Plan and Compliance Status of Emission Units covered within the Operating Permit proposed for Spindle Hill Energy, LLC. This document is designed for reference during the review of the proposed permit by the EPA, the public, and other interested parties.

Conclusions made in this report are based on information provided by the applicant in the Title V permit application submitted on April 8, 2008, comments on the draft permit submitted on May 22, 2013, previous inspection reports and various email correspondence, as well as review of Division files. This narrative is intended only as an adjunct for the reviewer and has no legal standing.

Any revisions made to the underlying construction permits associated with this facility, made in conjunction with the processing of this operating permit application, have been reviewed in accordance with the requirements of Regulation No. 3, Part B, Construction Permits, and have been found to meet all applicable substantive and procedural requirements. This operating permit incorporates and shall be considered to be a combined construction/operating permit for any such revision, and the permittee shall be allowed to operate under the revised conditions upon issuance of this operating permit without applying for a revision to this permit or for an additional or revised construction permit.

II. Description of Source

The Spindle Hill Energy Center is a peaking utility electric power generation facility classified under Standard Industrial Classification code 4911. The significant emission units at the facility include two (2) GE 7FA simple-cycle combustion turbines, a natural gas fired water bath gas heater (WBGH) used to heat natural gas before firing in the turbines, a fuel oil storage tank, and an emergency fire pump engine. Each turbine has an electrical gross power output of 145 MW and is capable of running on either natural gas or fuel oil.

This facility is located approximately 4 miles west of Ft Lupton, Colorado at 6335 County Road 19 (West of Co Rd 19 and North of Co Rd 14), in Weld County. This area

123/5468 Page 1 of 21

is classified as non-attainment for ozone and is located in the 8-hr Ozone Control Area as defined in Colorado Regulation No.7, Section II.A.1.

There are no affected states within 50 miles of the facility. Rocky Mountain National Park and the Rawah Wilderness Area are Federal Class I designated areas within 100 kilometers of the facility.

Based on information provided by the applicant, this facility is categorized as a NANSR major stationary source (Potential to Emit of NOx >100 tons/year in a non-attainment area for ozone) and a PSD minor stationary source (Potential to Emit < 250 tons/year for all criteria pollutants).

An analysis of the potential to emit (PTE) of NO_X and CO emissions from insignificant activities was required to be completed because the facility-wide potential to emit for permitted sources at this facility for these pollutants is within 10% of the limit for PSD major source status.

Based on information provided by the applicant, this facility is not subject to the provisions of the Accidental Release Prevention Program (Section 112(r) of the Federal Clean Air Act).

Potential emissions (in tons/yr) at the facility are as follows:

Emission Unit	Potential to Emit							
	NOx	VOC	СО	PM	PM ₁₀	SO ₂	H ₂ SO ₄	HAPs ¹
CT-01 ²	111.65	8.85	111.7	35.0	35.0	18.75	2.5	8.00 single/
CT-02 ²	111.65	8.85	111.7	35.0	35.0	18.75	2.5	15.00 total
WBGH-01 ³	7.44	0.29	4.57	0.29	0.29	0.08		
Tank-1 ⁴		0.06						
Fire Pump Engine ⁵	0.52	0.01	0.08	0.02	0.02	0.06		
Total	231.26	18.06	228.05	70.31	70.31	37.64	5.0	8/15

¹The single largest HAP emitted during natural gas firing is formaldehyde. The single largest HAP emitted during fuel oil firing is Manganese.

123/5468 Page 2 of 21

²Emissions based on manufacturer emission factors submitted with application, except SO₂ emission factors based on 0.8 gr/100 scf and assuming 92% of S converted to SO₂. H₂SO₄ are estimated to be 13.3% of SO₂ emission rate. Emissions are based on fuel heating values of 1020 Btu/scf for natural gas and 140,000 Btu/gal for fuel oil.

³Emissions based on permitted (maximum potential) fuel limit and emission factors from the vendor. All emission factors are more conservative than AP-42, except PM/PM₁₀.

⁴Emissions based on permitted throughput and EPA Tanks 4.0 run.

⁵Emissions based on vendor emission factors and 500 hours operating time.

A breakdown of individual HAP emissions for the turbines and the WBGH is given on page 21 of this document. All HAP emissions for the fuel oil storage tank and the firewater pump engine are below de minimus levels.

The startup dates for the turbines at this facility are as follows:

CT-01 – Initial Startup 4/6/2007, Commercial Operation 4/8/2007 CT-02 – Initial Startup 4/20/2007, Commercial Operation 4/21/2007

Actual emissions for the turbines for 2010 were reported with an APEN submitted in April 2011 and are as shown in the table below:

Emission Unit	Actual Emissions 2010						
	NOx	VOC	СО	PM	PM ₁₀	SO ₂	
CT-01	58.34	1.1	15.15	3.15	3.15	0.96	
CT-02	56.72	0.56	13.7	5.64	5.64	0.85	
Total	115.06	1.66	28.85	8.79	8.79	1.81	

III. Applicable Requirements

<u>40 CFR 60 Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units</u>

A new APEN was submitted for the WBGH on September 17, 2012 that revised the heat input rate from 9.0 MMBtu/hr to 11.1 MMBtu/hr. NSPS Subpart Dc applies to each steam generating unit that commenced construction, modification, or reconstruction after June 9, 1989 and has a maximum design heat input capacity of 100 MMBtu/hr or less, but greater than or equal to 10 MMBtu/hr (40 CFR 60, §60.40c(a)). As defined in this subpart, a steam generating unit is a device that combusts any fuel and produces steam or heats water or heats any heat transfer medium. The WBGH uses water as a heat transfer medium that in turn heats the gas lines feeding into the turbines. The WBGH is therefore subject to NSPS Subpart Dc. This heater will only be subject to recordkeeping and notification requirements since it burns only natural gas.

<u>40 CFR 60 Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels (including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984</u>

The distillate fuel oil storage tank at this facility has a capacity of 750,000 gallons and a vapor pressure of 0.0031 psia as determined by the EPA Tanks 4.0 run submitted with the Operating Permit application. Therefore, this tank is exempt from this subpart per $\S60.110b(b)$ as the tank total capacity is $\ge 150 \text{ m}^3$ (approximately 39,600 gallons) and it is used to store a liquid with a maximum true vapor pressure < 3.5 kPa (approximately 0.5 psia).

<u>40 CFR 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines</u>

123/5468 Page 3 of 21

A firewater pump engine was included in Attachment A (equipment details) of the initial approval construction permit issued on March 23, 2006 and is included in the insignificant activity list submitted with the operating permit application. In an email correspondence received September 6, 2012, the source stated that the firewater pump engine at this facility was ordered from the manufacturer (i.e. commenced construction) on August 2, 2006 and was manufactured after July 1, 2006; therefore it is subject to NSPS Subpart IIII (per §60.4200(a)(2)(ii)). With the promulgation of Subpart IIII on July 11, 2006, this engine could no longer be considered an insignificant activity according to Colorado Regulation No. 3, Part C, Section II.E. In addition, with the adoption of Subpart IIII into Colorado Regulation No. 6, Part A, on October 18, 2007, this engine became subject to APEN reporting and minor source permitting requirements according to Colorado Regulation No. 3, Section II.D. Since this engine can no longer be considered an insignificant activity, the applicable requirements have been included in Section II of the operating permit. Subpart IIII requirements include emission limitations for NOx, CO and particulate matter, as well as fuel requirements for sulfur content. Final revisions to NSPS Subpart IIII have been published in the Federal Register on January 30, 2013, and will become effective 60 days after publishing. The revisions applicable to this facility are related to the fuel use requirements of §60.4207(b) and the emergency engine provisions of §60.4211(f). These revisions were made to make NSPS Subpart IIII consistent with the RICE MACT, and do not change the fundamental requirements of these provisions as related to this facility. The conditions associated with these provisions will be updated before issuance of the operating permit if the published rule becomes effective prior to the date of permit issuance.

<u>40 CFR 60 Subpart KKKK - Standards of Performance for Stationary Combustion Turbines</u>

The stationary combustion turbines at this facility were constructed after February 18, 2005 and have a heat input rate at peak load greater than 10 MMBtu/hr. These turbines are therefore subject to Subpart KKKK. These turbines are exempt from the requirements of 40 CFR Subpart GG because they are regulated under Subpart KKKK (40 CFR 60, §60.4305). §60.4350(c) was not included in the operating permit requirements for Subpart KKKK. This condition specifies that correction of measured NO_x concentrations to 15% O₂ is not allowed, however, the standards for the turbines in Table 1 are for NO_X concentrations (in ppm) at 15% O₂. This was apparently an error that has been corrected in the proposed revision of Subpart KKKK published in the Federal Register on August 29, 2012 (77 FR 52554) that specifies that correction of NO_X concentration to 15% O₂ is only allowed if you elect to comply with the ppm standard in Table 1. The requirements of Subpart KKKK will be updated according to the current promulgated version before issuance if the operating permit is issued after the effective date of the revised version of the regulation, or upon renewal of the operating permit, if the permit is issued before the effective date.

Although not specifically indicated in the NSPS Subpart KKKK provisions, the Division has determined that the NSPS standards are not applicable during startup, shutdown, and malfunction, although any excess emissions during these periods must be reported with the semi-annual excess emission reports. The preamble to the final rule (71 FR 38497, published July 6, 2006) indicates that the limitations are not applicable during startup, shutdown and malfunction; "While continuous compliance is not required,

123/5468 Page 4 of 21

excess emissions during startup, shutdown, and malfunction must be reported" (page 38488). In addition, according to §60.8(c) of the General Provisions (40 CFR 60 Subpart A), "Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a performance test nor shall emissions in excess of the level of the applicable emission limit during periods of startup, shutdown, and malfunction be considered a violation of the applicable emission limit unless otherwise specified in the applicable standard". Therefore, the Division has added notes to the permit to specify that the NOx limits of NSPS KKKK do not apply during startup, shutdown, and malfunction; however, exceedances during those periods must be reported in the excess emissions monitoring report as specified in §60.4375(a).

<u>40 CFR 63 Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants</u> for Stationary Reciprocating Internal Combustion Engines

The firewater pump engine at this facility is subject to the requirements for new stationary compression ignition RICE (commenced construction after June 12, 2006) located at area sources of HAP emissions. New and reconstructed stationary compression ignition RICE at area sources must meet the requirements of Subpart ZZZZ by meeting the requirements of 40 CFR 60 Subpart IIII (40 CFR 63 §63.6590(c)(1)).

<u>40 CFR 63 Subpart JJJJJJ - National Emission Standards for Hazardous Air Pollutants</u> for Industrial, Commercial, and Institutional Boilers at Area Sources

The WBGH at this facility is exempt from the requirements of Subpart JJJJJJ per §63.11195(e), since it is a gas-fired boiler, as defined in §63.11237.

40 CFR 72 – Acid Rain Program (ARP)

This facility is subject to the Acid Rain Program since it is a new utility unit per §73.6(a)(3)(i), and does not meet the exemption of paragraph §73.6(b)(1) (commenced commercial operation after November 15, 1990).

Compliance Assurance Monitoring (CAM) Applicability

CAM applies to any emission unit that is subject to an emission limitation, uses a control device to achieve compliance with that emission limitation and has potential pre-control emissions greater than major source levels. The turbines are equipped with dry low NO_X (DLN) combustion systems and when burning distillate oil, the turbines utilize water injection to reduce NO_X emissions. DLN combustion systems are considered inherent process equipment and therefore are not control devices as defined in 40 CFR Part 64 § 64.1, as adopted by reference in Colorado Regulation No. 3, Part C, Section XIV. However, the Division considers that water injection is a control device. Nevertheless because the Title V permit specifies a continuous monitoring method for NO_X the turbines are not subject to the CAM requirements as provided for in 40 CFR Part 64 §64.2(b)(vi), as adopted by reference in Colorado Regulation No. 3, Part C, Section XIV.

Greenhouse Gases

123/5468 Page 5 of 21

The potential-to-emit of greenhouse gas (GHG) emissions from this facility is greater than 100,000 TPY CO₂e. Future modifications greater than 75,000 tons per year CO₂e may be subject to regulation (Regulation No. 3, Part A, I.B.44).

<u>Colorado Regulation No. 1 (5 CCR 1001-3) – Emission Control for Particulate Matter, Smoke, Carbon Monoxide, and Sulfur Dioxides</u>

The stationary combustion turbines at this facility are subject to Section III Particulate Matter process based standards for fuel burning equipment. Particulate matter shall not exceed 0.1 lb/MMBtu of heat input (Reg 1, Section III.A.1.c). These turbines are also subject to the Section VI Sulfur Dioxide process based standards for new combustion turbines. Sulfur Dioxide shall not be emitted in excess of 0.35 lb/MMBtu of heat input (Reg 1, Section VI.B.4.c.(ii)).

The Water Bath Gas Heater (WBGH) at this facility is subject to the Section III Particulate Matter process based standards for fuel burning equipment. Particulate matter emissions shall not exceed $0.5(FI)^{-0.26}$ where FI = fuel input in MMBtu/hr (Reg No. 1, Section III.A.1.b). The WBGH is also subject to the Part B, Section VI Sulfur Dioxide process based standards. The source shall limit emissions of sulfur dioxide to not more than two (2) tons per day (Reg No. 1, Section VI.B.5.a).

The Fire Pump Engine at this facility is subject to the process based standard of Section VI.B.4.b.(i) for new oil fired operations. Oil fired units with a heat input of less than 250 MMBtu/hr shall reduce SO₂ emissions to 0.8 lb/MMBtu of heat input.

<u>Colorado Regulation No. 6 (5 CCR 1001-8) – Standards of Performance for New Stationary Sources</u>

The stationary combustion turbines at this facility are subject to the state-only Part B, Section II standards for new fuel-burning equipment. Particulate matter emissions shall not exceed 20% opacity (Reg 6, Part B, Section II.C.3). There are no process based emission standards for particulate matter specified for sources with a fuel input capacity of greater than 250 MMBtu/hr. Also, emissions of sulfur dioxide shall not exceed 0.35 lb/MMBtu of heat input (Reg 6, Part B, Section II.D.3.b).

The Water Bath Gas Heater is subject to the Part B, Section II process based emission standards for new fuel-burning equipment: emissions of particulate matter shall not exceed $0.5(FI)^{-0.26}$ where FI = fuel input in MMBtu/hr (Reg 6, Part B, Section II.C.2); emissions of particulate matter shall not exceed 20% opacity (Reg 6, Part B, Section II.C.3).

IV. Emission Sources

Colorado Construction Permit 05WE0274 was issued as a facility-wide, initial approval permit on March 23, 2006. A final approval correction construction permit was issued for these emissions units on September 1, 2010. The final approval correction construction permit is a facility-wide permit covering all equipment/activities at this facility.

A. Facility Wide Conditions

123/5468 Page 6 of 21

- 1. Applicable Requirements: The appropriate provisions from the final approval correction construction permit have been incorporated into the Title V Operating Permit as follows:
 - All previous versions of this permit are canceled upon issuance of this permit.
 (Condition 1)

This condition is not a specific requirement and pertains only to the construction permit; therefore, it was not included in the operating permit.

 AIRS Point ID numbers shall be marked on the subject equipment for ease of identification. (Condition 2)

This condition is specific to construction permits, and has been completed as part of the self-certification process. This condition was not included in the operating permit.

 PSD requirements shall apply to this source at any such time that this source becomes major for PSD solely by virtue of a relaxation in any permit condition. (Condition 3)

This condition was not included in the operating permit since there are no actual requirements that apply. The PSD status of the source is discussed in Section I, Condition 3 of the operating permit.

 The applicant shall follow the most current operating and maintenance plan and recordkeeping format approved by the Division in order to demonstrate compliance on an ongoing basis with the requirements of this permit. (Condition 4)

The specific requirement to follow an operating and maintenance (O&M) plan is not included in the operating permit. The components of the current O&M plan include the operation of the CEMS to calculate and record emissions, fuel flow rate, and operating parameters, the provision to follow 40 CFR Part 60, Subpart A for notification, recordkeeping, and monitoring, and emissions calculation methodologies for pollutants not directly monitored by the CEMS. These components of the O&M plan are included in their respective portions of the operating permit.

- Regulation No. 6, Part A, Subpart A General Provisions apply (adopted by reference) (part of Condition 5):
 - At all times, the facility and control equipment shall, to the extent possible, be maintained and operated in a manner consistent with good air pollution control practices for minimizing emissions. Determination of whether or not acceptable operating and maintenance procedures are being used will be based on information available to the Division, which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source.

123/5468 Page 7 of 21

(Colorado Construction Permit 05WE0274 and 40 CFR 60 Subpart A §60.11(d), as adopted by reference in Colorado Regulation No. 6, Part A)

- No article, machine, equipment or process shall be used to conceal an emission that would otherwise constitute a violation of an applicable standard. Such concealment includes, but is not limited to, the use of gaseous diluents to achieve compliance with an opacity standard or with a standard that is based on the concentration of a pollutant in the gases discharged to the atmosphere. (§60.12)
- Written notification of construction and initial startup dates shall be submitted to the Division as required under §60.7.
 - Notifications of construction and initial startup dates have already been submitted to the Division. This portion of the General Provisions is not included in the operating permit.
- o Records of startups, shutdowns, and malfunctions shall be maintained, as required under §60.7.
- Written notification of continuous monitoring system demonstrations shall be submitted to the Division as required under §60.7.
- Excess Emission and Monitoring System Performance Reports shall be submitted as required under §60.7.
- o Performance tests shall be conducted as required under §60.8.
- o Continuous monitoring systems shall be maintained and operated as required under §60.13.

The applicable requirements from the NSPS General Provisions that have not been fulfilled are included in the operating permit.

• This facilities fuel (natural gas and fuel oil) use rate and electric power generation shall be limited by the emission limit/s specified in this permit (details in the Applicable Requirements sections of the respective emission units below). Compliance with the yearly consumption limits shall be determined on a rolling twelve (12) month total. Monthly records of the actual fuel use rate/s and electric power generation activities shall be maintained by the applicant and made available to the Division for inspection upon request. After the first twelve (12) months of operation, compliance with only the yearly limitation shall be required. (Condition 6)

The current construction permit for this facility only specifies yearly fuel consumption limitations, as this facility has been in operation for more than twelve months. The facility has no specific designated limit on the amount of electric power that can be generated, though it is implied through the fuel use limit. The fuel limit requirements of this condition have been included in the operating permit.

123/5468 Page 8 of 21

Total facility emissions of air pollutants shall not exceed the following limitations.
 Compliance with the annual limits shall be determined on a rolling twelve (12) month total. The permit holder shall calculate monthly emissions and keep a compliance record on site for Division review (Condition 7):

0	PM	70.00 tons/yr
0	PM ₁₀	70.00 tons/yr
0	NOx	223.30 tons/yr
0	CO	223.40 tons/yr
0	SO ₂	37.50 tons/yr
0	VOC	17.70 tons/yr
0	Sulfuric acid	5.00 tons/yr
0	Any single HAP	8.00 tons/yr
0	Total HAPs	15.00 tons/yr

The facility-wide emission limitations identified in the Final Approval Correction Construction Permit (05WE0274) were initially based only on the requested fuel throughput and corresponding emissions from the turbines. Additionally, recent APEN updates for the WBGH requested increases in annual fuel throughput and emissions, though the facility-wide emission limits remained the same. The Division does not consider that an overall facility limit is appropriate or necessary for this facility; therefore, separate criteria pollutant emission limits were set (using the modification procedures in Regulation No. 3, Part C) for the turbines (as a group) and the WBGH in order to more accurately characterize the facility's emissions. The facility-wide potential to emit increased by the amounts attributable to the WBGH and the fuel oil storage tank, due to the fact that these were not originally included in the facility-wide emission limits. The criteria pollutant emission limits established for individual units have been included in the operating permit.

HAP emission limits were left as facility wide limits and have been included in the operating permit under a facility wide section.

APEN reporting requirements. (Condition 9)

The APEN reporting requirements are included in Section IV (General Conditions), Condition 22.e of the operating permit.

- **2. Emission Factors:** The emission factors associated with the specified emission units are included in their respective sections.
- **3. Monitoring:** The monitoring requirements associated with the specified emission units are included in their respective sections.

123/5468 Page 9 of 21

- **4. Compliance Status:** In the Title V permit application, the source indicated that the facility was in compliance with all current applicable facility wide requirements.
- B. CT-01: One (1) General Electric simple-cycle combustion turbine, Model GE 7FA, Serial No. 297986, heat input rated at 1353.6 MMBtu/hr for natural gas and 1527 MMBtu/hr for fuel oil (for an ambient temperature of 50°F). This unit runs an electric power generator and has a gross power output of 145 megawatts. This unit is equipped with an advanced (4th generation) Dry Low NOx (DLN) combustion system for minimization of emissions of NOx. NOx emissions are controlled by water injection during fuel oil firing.
 - CT-02: One (1) General Electric simple-cycle combustion turbine, Model GE 7FA, Serial No. 297987, heat input rated at 1353.6 MMBtu/hr for natural gas and 1527 MMBtu/hr for fuel oil (for an ambient temperature of 50°F). This unit runs an electric power generator and has a gross power output of 145 megawatts. This unit is equipped with an advanced (4th generation) Dry Low NOx (DLN) combustion system for minimization of emissions of NOx. NOx emissions are controlled by water injection during fuel oil firing.
 - 1. Applicable Requirements: The appropriate provisions from the final approval correction construction permit have been incorporated into the Title V Operating Permit as follows:
 - Regulation No. 6 Standards of Performance for New Stationary Sources (Condition 5):
 - Part A, Subpart GG Standards of Performance for Stationary Gas Turbines.
 - Concentration of NOx shall not exceed 110 ppmvd at 15% O₂ when combusting natural gas, and shall not exceed 102 ppmvd at15% O₂ when combusting fuel oil
 - Concentration of SO₂ shall not exceed 150 ppmvd at 15% O₂ or sulfur content in fuel not to exceed 0.8% by weight

With the promulgation of 40 CFR Subpart KKKK on July 6, 2006 the turbines at this facility became exempt from the requirements of Subpart GG; therefore, Subpart GG requirements are not included in the operating permit.

- Part A, Subpart KKKK Standards of Performance for Stationary Gas Turbines
 - No specific requirements from Subpart KKKK were included in the construction permit, since at the time of permit issuance the Subpart had not been promulgated. The appropriate requirements from Subpart KKKK are included in the operating permit.
- Part B, Section II— Standards of Performance for New Fuel-Burning Equipment (These are State-Only requirements)

123/5468 Page 10 of 21

 D.3 - Combustion Turbines: Sulfur Dioxide discharged into the atmosphere shall not be in excess of 0.35 pounds per MMBtu heat input.

This requirement was streamlined with the NSPS KKKK limit on sulfur content of fuel that is burned in the turbines of 0.06 lb/MMBtu. The record of the streamlined condition is included in Section III of the operating permit.

Although not included in the construction permit, the turbines at this facility are subject to the following requirements from Part B, Section II:

- Particulate matter emissions shall not exceed 20% opacity (Reg 6, Part B, Section II.C.3)
- For each combustion turbine, a continuous emission monitoring system (CEMS) shall be installed, maintained/calibrated, and operated to determine and record the following (Condition 8):
 - o Combustion fuel (natural gas and fuel oil) flow rate.
 - Concentration of NOx, ppmvd hourly average, in the exhaust, corrected to 15% Oxygen.
 - o Emissions of NOx (tons/month and tons/rolling 12 months).
 - o Concentration of carbon monoxide, ppmv hourly, in the exhaust.
 - o Emissions of carbon monoxide (tons/month and tons/rolling 12 months).
 - o Concentration of oxygen, percent, hourly average, in the exhaust.
 - o Commencement and end of startup events.
 - o Rate of water injection during fuel oil firing, and water-to-fuel oil ratio.

Quality assurance, quality control, and excess emission reporting shall conform to the Division Document, "Guidelines for State-Only Required Continuous Monitoring Systems in the State of Colorado". Provisions of 40 CFR 60, Subpart A-General Provisions shall be followed for notification, recordkeeping, and monitoring. The CEMS data shall be used to determine compliance with the emissions limits for NOx and CO.

The references to quality assurance/quality control activities for the CEMS and excess emission reporting have been changed to refer to portions of the federal regulations specific to the pollutants being monitored, as opposed to the Colorado state-only guidelines. This condition has been included in the operating permit under the requirements for continuous emission monitoring.

- Fuel Consumption Limits (from Attachment A of the construction permit)
 - o Fuel consumption limits for both turbines together are as follows:

123/5468 Page 11 of 21

- 11,328 MMscf/yr for natural gas (based on a heat value of 1020 Btu/scf)
- 11,110,743 gallons/yr of distillate fuel oil (based on a fuel oil heating value of 140,000 Btu/gal)
- For a combination of natural gas and fuel oil: for each 1,000,000 gallons of fuel oil, consumption of natural gas shall be reduced by 1.040.614 MMscf.

The requirement to reduce the natural gas consumption limit when burning fuel oil was changed to reflect that this reduction should be done on a per gallon basis.

Sulfur content of fuel oil shall not exceed 0.05% by weight.

Although not specifically indentified in Colorado Construction Permit 05WE0274, the turbines at this facility are subject to the following applicable requirements:

- Colorado Regulation No.1
 - Except as provided in [Reg 1, Section II.A.4] below, no owner or operator of a source should allow or cause the emission into the atmosphere of any air pollutant that is in excess of 20% opacity. (Reg 1, Section II.A.1)
 - No owner or operator of a source shall allow or cause to be emitted into the atmosphere any air pollutant resulting from the building of a new fire, cleaning of fire boxes, soot blowing, start-up, any process modification, or adjustment or occasional cleaning of control equipment, which is in excess of 30% opacity for a period or periods aggregating more than six minutes in any sixty consecutive minutes. (Reg 1, Section II.A.4)
 - Particulate matter emissions shall not exceed 0.1 lb/MMBtu of heat input (Reg 1, Section III.A.1.c)
 - Sulfur Dioxide shall not be emitted in excess of 0.35 lb/MMBtu of heat input (Reg 1, Section VI.B.4.c.(ii)), calculated on a 3-hour rolling average (Reg 1, Section VI.B.2)
- Each turbine is also subject to the Acid Rain Program as follows:
 - o Acid rain permitting requirements per 40 CFR Part 72.
 - Continuous emission monitoring requirements per 40 CFR Part 75.
 - The sulfur dioxide allowance system (40 CFR Part 73) and excess emissions (40 CFR Part 77).
 - Allocated SO₂ allowances are listed in 40 CFR Part 73.10(b), however, since these are new units, no allowances were allocated. SO₂ allowances must be obtained per 40 CFR Part 73 to cover SO₂ emissions for the particular calendar year.

123/5468 Page 12 of 21

 There are no NO_X emission limitations since these units are not coal-fired boilers.

Streamlining of Applicable Requirements

<u>SO</u>2

Regulation No. 1 (Section VI.B.4.c.(ii)) and Regulation No. 6 (Part B, Section II.D.3.b) contain the same SO_2 requirements; emissions of SO_2 shall not exceed 0.35 lb/MMBtu. The Regulation No. 6, Part B requirement is a state-only requirement. The NSPS general provisions of 40 CFR Part 60, Subpart A are adopted by reference in Reg 6, Part B, Section I.A.. 40 CFR 60 Subpart KKKK places a limit on the sulfur content of fuel burned in the turbines of 0.060 lb/MMBtu (§60.4330(a)(2)). This limit is applicable whether natural gas or fuel oil is burned in the turbines. Since this sulfur limit on fuel is more stringent than both the Reg 1 and Reg 6 SO_2 limits at all times, the Regulation No. 1 and Regulation No. 6, Part B SO_2 requirements have been streamlined out of the operating permit.

Opacity

The turbines at this facility are subject to the Reg 1 opacity requirements of 30% (Reg 1, Section II.A.4), during certain operational activities, and 20% at all other times (Reg 1, Section II.A.1). The turbines are also subject to the state-only Reg 6, Part B 20% opacity requirement for particulate matter. The Reg 6 opacity requirement is not applicable during periods of startup, shutdown, and malfunction, per 40 CFR 60 Subpart A, §60.11(c) (adopted by reference in Reg 6, Part B, Section I.A). The Reg 1 20%/30% opacity requirements are more stringent than the Reg 6, Part B 20% opacity requirement during periods of startup, shutdown, and malfunction, while the Reg 6 opacity requirement is more stringent during the operational activities of fire building, cleaning of fire boxes, soot blowing, process modifications and adjustment or occasional cleaning of control equipment. Therefore, since no one opacity requirement is more stringent than any other at all times, all the opacity requirements are included in the operating permit.

It should be noted that when the turbines burn natural gas as fuel, the Division will presume, in the absence of credible evidence to the contrary, that these units are in compliance with all of the opacity requirements. When the turbines are using fuel oil as fuel: semi-annual opacity readings are required when any of the specific activities listed in the Reg 1 Section II.A.4 provision (30% limit) are performed during the semi-annual period; annual opacity readings are required to demonstrate compliance with the Reg 1, Section II.A.1 provision (20% limit) for any annual period in which fuel oil is burned in the turbines.

Note: In comments on the draft permit, received during source review, the source requested that these opacity readings be required only after fuel oil runs lasting at least one hour, since most runs on fuel oil are very brief, and would not allow for enough time to conduct a Method 9 observation. The Division concluded that this would suffice for the 20% opacity limit, since this limit applies during normal operation of the source (i.e. not during events described in Regulation No. 1, Section II.A.4) and opacity observations taken an hour into a fuel oil run would still be representative of these operating conditions. However, the 30% opacity limit is applicable during startup conditions for these units, so opacity observations taken to

123/5468 Page 13 of 21

demonstrate compliance with this provision cannot be limited to those fuel oil runs lasting at least one hour.

2. Emission Factors: NO_X and CO emissions shall be determined using the continuous emission monitoring system required by the construction permit. SO₂ emissions shall be determined using monitoring methods required by 40 CFR Part 75, Appendix D.

Emission factors to be used for PM/PM₁₀, VOC, sulfuric acid, formaldehyde, and manganese are listed in the table below.

Dallestand	Unit	1	Unit 2		
Pollutant	Natural Gas	Fuel Oil	Natural Gas	Fuel Oil	
	(lb/MMBtu)	(lb/MMBtu)	(lb/MMBtu)	(lb/MMBtu)	
PM	0.002	0.007	0.004	0.008	
PM ₁₀	0.002	0.007	0.004	0.008	
VOC	0.0007	0.0004	0.0004	0.0004	
H ₂ SO ₄		0.0006		0.0009	
Formaldehyde	0.0001	0.0003	0.0005	0.0003	
Manganese		0.0008		0.0008	

Notes:

- 1) Fuel oil formaldehyde emission rate from AP-42, Table 3.1-4
- 2) Fuel oil manganese emission rate from AP-42, Table 3.1-5
- 3) Unit 1 natural gas formaldehyde emission rate from November 5, 2009 Compliance test
- 4) All other emission rates from April 18 May 9, 2007 Compliance Test

In order to calculate Total HAPs, emission factor ratios were developed from the AP-42 Tables 3.1-3, 3.1-4, and 3.1-5 emission factors to be applied to the calculated formaldehyde emissions. These ratios were developed by taking the ratio of each pollutant specific emission factor to that of formaldehyde (both from AP-42, for either natural gas or fuel oil firing, as appropriate) and adding these together (according to their respective fuel type) to represent the total amount of other HAPs emitted during either natural gas or fuel oil firing. These emission factor ratios will be multiplied by the emissions calculated for formaldehyde (using the emission factors above, either from testing or AP-42), depending on what fuel the turbines are firing, in order to calculate the total amount of other HAPs emitted. In this methodology, the ratio of HAPs emitted during natural gas firing is the same as that according to the AP-42 emission factors, but the mass of pollutants emitted is based on the unit specific formaldehyde emission rate demonstrated by the compliance tests. The HAP emissions during fuel oil firing are all calculated according to AP-42 emission rates.

Spindle Hill is still required to report individual HAPs over the de minimis levels for APEN reporting and fee purposes.

3. Monitoring Plan: The source will be required to monitor compliance with the NOx exhaust gas concentration limits of 40 CFR 60, Subpart KKKK (as well as the O_2 concentration of the exhaust gases, to correct NO_X emissions to 15% O_2), the annual NOx and CO emission limits, and the fuel consumption limits using the CEMS. Compliance with the annual SO_2 emission limit and the limit on the sulfur content of fuel burned in the turbine will be monitored using the methods of 40 CFR 75, Appendix D. Compliance with the PM, PM10, VOC, H_2SO_4 , and HAPs emission limits will be

123/5468 Page 14 of 21

monitored using the emission factors above and the fuel consumption from the turbines as monitored using the CEMS.

Compliance with the opacity limits will be presumed, in absence of credible evidence to the contrary, when natural gas is burned in the turbines. During fuel oil burning, compliance with the opacity limits will be determined semi-annually using Method 9 readings for periods when fuel oil is burned and when specific activities subject to the 30% requirement are performed.

- **4. Compliance Status:** In the Title V permit application, the source indicated that the turbines were in compliance with all applicable requirements.
- C. EU 003: One (1) GTS Energy natural gas fired Water Bath Gas Heater, Model ISNG-HWB8.3s5x, Serial No. PC06035, heat input rated at 11.1 MMBtu/hr.
- **1. Applicable Requirements:** The appropriate provisions from the final approval correction construction permit have been incorporated into the Title V Operating Permit as follows:
 - Fuel Consumption Limits (from Attachment A of the construction permit)
 - Natural gas throughput for the WBGH is limited to 34.94 MMscf/yr. This is based on a natural gas heating value of 1020 Btu/scf.

An APEN was submitted, with the Title V permit application, on April 8, 2008 that requested the annual fuel consumption be increased to 77.29 MMscf/yr. This was to represent the maximum potential fuel use of the heater, however, further information was provided by the supplier that demonstrated the heat input rate of the heater was actually 11.1 MMBtu/hr, as opposed to 9.0 MMBtu/hr. An additional APEN was submitted on September 17, 2012 to account for the new heat input rate and a new maximum potential fuel use of 95.33 MMscf/yr. This is based on a fuel heating value of 1020 Btu/scf. This new fuel consumption limit will be incorporated into the operating permit.

Although not specifically indentified in Colorado Construction Permit 05WE0274, the WBGH at this facility is subject to the following applicable requirements:

- Colorado Regulation No. 1
 - Except as provided in [Reg 1, Section II.A.4] below, no owner or operator
 of a source should allow or cause the emission into the atmosphere of any
 air pollutant that is in excess of 20% opacity. (Reg 1, Section II.A.1)
 - No owner or operator of a source shall allow or cause to be emitted into the atmosphere any air pollutant resulting from the building of a new fire, cleaning of fire boxes, soot blowing, start-up, any process modification, or adjustment or occasional cleaning of control equipment, which is in excess of 30% opacity for a period or periods aggregating more than six minutes in any sixty consecutive minutes. (Reg 1, Section II.A.4)

123/5468 Page 15 of 21

Based on engineering judgment, the Division believes that the operational activities of fire building, cleaning of fire boxes, and soot blowing do not apply to the water bath gas heater, and process modifications are not likely to occur with this unit. In addition, since this heater is not equipped with control equipment, the operational activities of adjustment or occasional cleaning of control equipment also do not apply. Therefore, for this unit, the 30% opacity provision only applies during startup.

- Particulate matter emissions shall not exceed 0.5(FI)^{-0.26} where FI = fuel input in MMBtu/hr (Section III.A.1.b)
- The source shall limit emissions of sulfur dioxide to not more than two (2) tons per day (Section VI.B.5.a)
- Colorado Regulation No. 6
 - 40 CFR 60 Subpart Dc Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units (As adopted by reference in Colorado Regulation No. 6, Part A)

This heater is only subject to reporting and recordkeeping requirements of §60.48C since it burns only natural gas as a fuel.

- (State-only) Emissions of particulate matter shall not exceed 0.5(FI)^{-0.26} where FI = fuel input in MMBtu/hr. (Part B, Section II.C.2)
- (State-only) Emissions of particulate matter shall not exceed 20% opacity.
 (Part B, Section II.C.3)

Streamlining of Applicable Requirements

PM

Regulation No. 1 (Section III.A.1.b) and Regulation No. 6 (Part B, Section II.C.2) contain the same particulate matter emission requirements: emissions of particulate matter shall not exceed 0.5(FI)^{-0.26} where FI = fuel input in MMBtu/hr. The Regulation No. 6, Part B requirement is a state-only requirement. Regulation No. 6, Part B, Section I.A, adopts, by reference, the 40 CFR Part 60 Subpart A general provisions. Although not specifically stated in the general provisions, the Division has concluded, after reviewing EPA determinations, that the NSPS standards are not applicable during startup, shutdown and malfunction, although any excess emissions during these periods must be reported in the excess emission reports. Therefore, the Division considers that the Regulation No. 6, Part B particulate matter requirements do not apply during periods of startup, shutdown, and malfunction. The Regulation No. 1 requirements are therefore more stringent than the Regulation No. 6 requirements, and the Regulation No. 6 requirements have been streamlined out of the permit.

Opacity

The WBGH at this facility is subject to the Reg 1 opacity requirements of 30% during certain operational activities (Reg 1, Section II.A.4) and 20% at all other times (Reg 1, Section II.A.1). The WBGH is also subject to the state-only Reg 6, Part B 20% opacity

123/5468 Page 16 of 21

requirement for particulate matter. Since the Reg 6 opacity requirement is not applicable during periods of startup, shutdown, and malfunction (per 40 CFR 60 Subpart A, §60.11(c), adopted by reference in Reg 6, Part B, Section I.A), and the Division has determined that startup is the only operational activity of the Reg 1 30% opacity requirement that applies, the Reg 1 opacity requirements are always equal to or more stringent than the Reg 6 requirements, and the Reg 6 requirements will be streamlined out of the permit.

2. Emission Factors: The following emission factors were provided for calculating emissions for the water bath gas heater. NO_X and CO emissions from the WBGH shall be determined using the emission factors listed below. Emissions for all other pollutants are below APEN reporting thresholds.

Pollutant	Emission Factor (lb/MMscf)		
NO _X	156.06		
CO	95.88		
VOC	6.12		
SO ₂	1.73		
PM ₁₀	6.12		

Note: Emission factors are from vendor specifications and based on a fuel heating value of 1020 Btu/scf. All emission factors, except PM/PM₁₀, are more conservative than AP-42 Section 1.4 factors for Natural Gas Combustion.

Emissions of all HAPs are below de-minimus levels, and are based on emission factors from AP-42, Table 1.4-3.

- 3. Monitoring Plan: The source will be required to record and maintain records of the fuel use for this heater on a monthly basis to demonstrate compliance with the annual fuel use limits. The recorded fuel consumption will be used with emission factors from the vendor to calculate emissions of NOx and CO to demonstrate compliance with these annual limitations.
- **4. Compliance Status:** In the Title V permit application, the source indicated that the Water Bath Gas Heater was in compliance with all applicable requirements.
- D. TANK-1: One (1) 750,000 gallon Pittsburg Tank vertical fixed roof storage tank, for storage of distillate fuel oil. There is no model or serial number associated with this tank.

The only applicable requirement in the final approval correction construction permit for the fuel oil tank was a fuel oil throughput limit of 11,110,743 gallons/year.

This fuel oil tank is actually exempt from APEN reporting and construction permitting requirements per Colorado Regulation No. 3, Part A, Section II.D.1.a, since uncontrolled actual emissions from this unit are less than one (1) ton per year. This unit can also be considered an insignificant activity for operating permit purposes per Reg 3, Part C, Section II.E.3.a.

123/5468 Page 17 of 21

Therefore, since the fuel oil tank is exempt from APEN reporting and construction permitting requirements as stated above, and there are no other applicable requirements that would make this exemption non-applicable, the fuel oil throughput limit has not been included in the operating permit. This emission unit will now be considered an insignificant activity for purposes of this operating permit, and will be listed in the insignificant activity list included in Appendix A.

- E. Fire Pump Engine: One (1) Clarke, Firewater Pump Engine, Model VMFP-T6HT, Serial No. 91B02978, site-rated at 145 HP, heat input rated at 1.96 MMBtu/hr
 - 1. Applicable Requirements: Since, at the time of the initial permit issuance, this engine was exempt from APEN reporting and minor source construction permit requirements (before Colorado's adoption of 40 CFR 60 Subpart IIII; see Subpart IIII section in Applicable Requirements, above), no applicable requirements were included in the construction permit. The following appropriate applicable requirements for this engine are included in the operating permit:
 - Colorado Regulation No. 1
 - Except as provided in [Reg 1, Section II.A.4] below, no owner or operator of a source should allow or cause the emission into the atmosphere of any air pollutant that is in excess of 20% opacity. (Reg 1, Section II.A.1)
 - No owner or operator of a source shall allow or cause to be emitted into the atmosphere any air pollutant resulting from the building of a new fire, cleaning of fire boxes, soot blowing, start-up, any process modification, or adjustment or occasional cleaning of control equipment, which is in excess of 30% opacity for a period or periods aggregating more than six minutes in any sixty consecutive minutes. (Reg 1, Section II.A.4)
 - Based on engineering judgment, the Division believes that the operational activities of fire building, cleaning of fire boxes, and soot blowing do not apply to diesel engines, and process modifications are not likely to occur with this emergency engine. In addition, since this engine is not equipped with control equipment, the operational activities of adjustment or occasional cleaning of control equipment also do not apply to this engine. Therefore, for this unit, the 30% opacity provision only applies during startup.
 - o SO₂ emission shall not exceed 0.8 lbs/mmBtu (Reg 1, Section VI.B.4.b.(i)).
 - Note that since the requirements of NSPS IIII for this engine limit the sulfur content of the diesel fuel to 15 ppm, which is well below the Reg 1 limit (15 ppm equates to approximately 7.5E-04 lb/MMBtu, assuming a density of 7 lb/gal), the Reg 1 limit will be streamlined out of the permit.
 - RACT for VOC shall be met by complying with the NSPS Subpart IIII requirements. (Colorado Regulation No. 3, Part B, Section III.D.2.a and Regulation No. 7, Section II.C.2)

123/5468 Page 18 of 21

 40 CFR 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines; emission limitations for NOx, CO, and particulate matter as well as fuel limitations.

According to the manufacturer's emission factors provided below, this engine meets the emission limitations for non-emergency engines. The only emission limitation for non-emergency engines in the same category as this engine is 6.9 g/hp-hr for NO_X . Therefore the Subpart IIII requirement to install a non-resettable hour meter for engine that do not meet the standards of non-emergency engines will not be included in the permit.

• 40 CFR Part 63 Subpart ZZZZ requirements – new engines must meet the requirements of 40 CFR 60 Subpart IIII.

Streamlining of Applicable Requirements

SO_2

The Fire Pump Engine is subject to Colorado Regulation No. 1, Section VI.B.4.b.(i), which requires SO_2 emissions from new oil fired operations with an oil heat input of less than 250 MMBtu/hr be limited to 0.8 lb/MMBtu. This Fire Pump Engine is also subject to the requirements of NSPS Subpart IIII, which limit the sulfur content of diesel fuel purchased for use in the engines to 15 ppm by weight. Since the NSPS IIII limit is always more stringent than the Reg 1 limit (see notes in Applicable Requirements section above), and is applicable at all times, the Reg 1 limit will be streamlined out of the permit for the NSPS IIII limit.

Emission Factors

Emissions from the Fire Pump Engine were calculated based on the following emission factors provided by the manufacturer.

Pollutant	¹ Emission Factor (g/hp-hr)		
NO _X	6.57		
CO	0.99		
VOC	0.12		
² SO ₂	0.8		
PM/PM ₁₀ /PM _{2.5}	0.19		
Formaldehyde	1.18E-08 (lb/MMBtu)		

All emission factors are less than AP-42 factors.

All emissions from the emergency Fire Pump Engine are below APEN de minimus reporting levels (based on 500 hours per year of operation), therefore no emission or throughput limits have been included in the operating permit.

2. Monitoring Plan

123/5468 Page 19 of 21

²Based on 0.2% sulfur content of fuel by weight.

The source shall be required to monitor hours of operation on a rolling 12 month total. Compliance with the opacity limits shall be monitored using EPA Method 9 observations. The NSPS Subpart IIII limitations on emissions and sulfur content of fuel shall be monitored by keeping records demonstrating compliance with these limits.

3. Compliance Status

This engine has not had any previous applicable requirements for which to demonstrate compliance.

V. Ambient Impacts Analysis

Modeling of emissions was conducted for this facility in 2005 for the Initial Approval construction permit. The modeling analysis demonstrated that the construction of the facility would not cause or contribute to a violation of ambient air quality standards for any of the pollutants and averaging times analyzed.

VI. Insignificant Activities

The Title V permit application indicated that insignificant activities at the facility were included in the following general categories: landscaping and site housekeeping devices equal to or less than 10 HP in size, chemical storage areas (where chemical are stored in closed containers) where total storage capacity does not exceed 5000 gallons, storage tanks of lubricating oils with capacity less than 40,000 gallons, storage tanks with annual throughput less than 400,000 gallons (with limited contents), stationary internal combustion engines (limited hours of operation, horsepower, or emissions), and air pollution emission units with emissions less than appropriate de minimis levels. A list of the specific insignificant activities associated with this facility is included in the operating permit. As mentioned above, the firewater pump engine was previously listed as an insignificant activity, but can no longer be considered insignificant because it is now subject to Federal NSPS and NESHAP standards.

VII. Alternative Operating Scenarios

No alternative operating scenarios were requested for this facility.

VIII. Permit Shield

No permit shield was requested for this facility.

123/5468 Page 20 of 21

Facility Wide Potential HAP Emissions (lb/yr)

Pollutant	Turbines ¹	WBGH ²	Total	Total (tpy)
1,3 Butadiene	29.2		29.2	0.015
Acetaldehyde	453		453	0.227
Acrolein	72.4		72.4	0.036
Arsenic	16.8		16.8	0.008
Benzene	219.6	0.2	219.8	0.110
Beryllium	0.4		0.4	0.000
Cadmium	7.4		7.4	0.004
Chromium	16.8		16.8	0.008
Dichlorobenzene		0.1	0.1	0.000
Ethylbenzene	362.4		362.4	0.181
Formaldehyde	13165.8	7.1	13172.9	6.586
Hexane		171.6	171.6	0.086
Lead	21.4		21.4	0.010
Manganese	1204.2		1204.2	0.602
Mercury	1.8		1.8	0.000
Napthalene	68.2		68.2	0.034
Nickel	7		7	0.004
PAHs	85.4		85.8	0.04
Propylene Oxide	328.4		328.4	0.164
Selenium	38.2		38.2	0.019
Toluene	1472	0.3	1472.3	0.736
Xylene	724.8		724.8	0.36

¹Turbine HAP emissions are those given in the operating permit application (100% load, 50°F ambient temperature, 98% of permitted fuel limits). Emissions factors used to calculate HAPs are from AP-42 section 3.1, except the emission factor for formaldehyde is from the October 25-26 2007 Unit 1 formaldehyde compliance test, with a 25% safety factor.

All HAP emissions from the fuel oil storage tank and the Firewater Pump Engine are below de minimus levels.

Actual HAP emissions from the turbines will be calculated according to the method specified in the turbine section above.

123/5468 Page 21 of 21

²The WBGH HAP emissions are those given in a revised APEN received on September 17, 2012.